BRUHATH BENGALURU MAHANAGARA PALIKE

QUALITY CONTROL TEST REPORT

Name of Work: Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Civil Aim Consultants & Engineers

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No.01, Satvika Nilaya,Opp.Widia Poorna Prajna School,Ramaiah Layout Nagasandra Bengaluru -560073.

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QC-ABSTRACT

Name of Work:- Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sl No.	Item	Quantity As Per BOQ	Required No's of tests	Actual No's of tests	Tests
1	PCC 1:3:6	32.16 Cum	1	1	Cement
					Sand, Aggregates
2	Steel	4.31 Tonne	1	1	-
3	M20	78.39 Cum	5	5	Concrete Cube Compressive Strength
4	Slab 100mm	236.48 Sqm	1	1	Compressive strength
5	WMM	19.78 Cum			-
	Gradation		1	1	
	Aggregate Impact Value		1	1	
	Shape test		1	1	
	Atterberg Limit		1	1	
6	DBM	13.26 Cum			-
	Quality Binder		1	1	
	Aggregate Impact Value		1	1	
	Shape test		1	1	
	Specific Gravity		1	1	
	Gradation		1	1	
	Stability of Mix		1	1	
	Bitumin Content		1	1	
7	BC	47.77 Cum			-
	Quality Binder		1	1	
	Aggregate Impact Value		1	1	
	Shape test		1	1	
	Specific Gravity		1	1	
	Gradation		1	1	
	Stability of Mix		1	1	
	Bitumin Content		1	1	

Cubes	0-5 m^3	1set
	6-15 m^3	2set
	16-30 m^3	3set
	31-50 m^3	4 set
	Add 1set for every 50 Cum	

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Job No : CQCE/BBMP/VP/W.No.10/2021-22 Date: 05.05.2021

TEST REPORT ON CEMENT

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID: : Cement (Zuari 53 grade OPC)

Sample Supplied by: : AGENCY

Date of Manufacture: :March - 2021

Date of Testing : 03.05.2021 to 05.05.2021

Sl.No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 269:2015
1	a) Initial Setting Time	IS-4031 (Part - 5):1988(RA 2014)	140 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part - 5):1988(RA 2014)	350 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part 3) :1988 (RA 2014) by the Le-Chatelier method	1 mm	Not more than 10 mm
3	Standard Consistency	IS-4031 (Part -4)	30.00%	-

ASSISTANT EXECUTIVE ENGINEER
Vidyaranyapura Sub-Division
BBMP, Bangalore Palike

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Authorised Signatory

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date : 05.05.2021

TEST REPORT ON COARSE AGGREGATES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Date of Testing : 05.05.2021

IS Code : IS 383:2016

: IS 2386 (Part 1):1963(RA 2011)

Material : 20mm Aggregates

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Requirements as per IS 383:2016
40	0	0	0	100	100
20	189	3.8	3.8	96.2	95-100
10	2836	56.7	60.5	39.5	25-55
4.75	1752	35.0	95.5	4.5	0-10

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Authorised Signatory

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date : 05.05.2021

TEST REPORT ON COARSE AGGREGATES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Date of Testing : 05.05.2021

IS Code : IS 383:2016

: IS 2386 (Part 1):1963(RA 2011)

Material : 40mm Aggregates

Total Wt. of Aggregates in gms **15000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Requirements as per IS 383:2016
80	0	0	0	100	100
40	198	1.32	1.32	98.68	95-100
20	8326	55.51	56.83	43.17	30-70
10	3120	20.80	77.63	22.37	10-35
4.75	2836	18.91	96.53	3.47	0-5

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date : 05.05.2021

TEST REPORT ON FINE AGGREGATES (SAND)

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Date of Testing : 05.05.2021

IS Code : IS 383:2016

: IS 2386 (Part 1):1963(RA 2011)

Material : Sand

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Requirements as per IS 383:2016 Spec.Limits For Zone-II
10	0	0	0	100	100
4.75	84	8.40	8.40	91.6	90-100
2.36	119	11.90	20.30	79.7	75-100
1.18	182	18.20	38.50	61.5	55-90
600 Micron	265	26.50	65.00	35.0	35-59
300 Micron	185	18.50	83.50	16.5	8-30
150 Micron	136	13.60	97.10	2.9	0-10

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date : 05.05.2021

TEST REPORT ON FINE AGGREGATES (SAND)
IS 1542-1992

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Date of Testing : 05.05.2021

Material : Sand(Plastering) Total wt. of aggregates in gms = **1000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits as per IS 1542-1992
10	0	0	0	100	100
4.75	14	1.40	1.40	97.6	95-100
2.36	16	1.60	3.00	94.1	95-100
1.18	38	3.80	6.80	88.5	90-100
600 Micron	75	7.50	14.30	61.7	80-100
300 Micron	264	26.40	40.70	11.8	20-65
150 Micron	515	51.50	92.20	7.8	0-15

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date : 05.05.2021

TEST REPORT ON FINE AGGREGATES (SAND)
IS 2116-1980

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Date of Testing : 05.05.2021

Material : Sand(Masonry) Total wt. of aggregates in gms = **1000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits as per IS 2116-1980
4.75	0	0.00	0.00	100.0	100
2.36	14	1.40	1.40	97.6	90-100
1.18	35	3.50	4.90	94.1	70-100
600 Micron	89	8.90	13.80	88.5	40-100
300 Micron	255	25.50	39.30	61.7	5-70
150 Micron	498.6	49.86	89.16	11.8	0-15

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date : 07.05.2021

TEST REPORT OF PHYSICAL PROPERTIES OF REINFORCEMENT STEEL

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Steel Dia/Length : 8mm, 10mm, 12mm" TMT"

Reference to BIS codes : IS 1786:2008(RA 2013) High Strength Deformed Steel Bars and Wires for Concrete Reinforcement-Specification

: IS 1608:2005 Metallic Materials- Tensile Testing at Ambient Temperature

Date of test : 07.05.2021

S.No	Brand	Nominal size (dia in mm)	Mass per meter (kg/meter)	TENSILE STRENGTH			
				0.20 % proof stress/ yield stress (N/mm^2)	Tensile strength (N/mm^2)	TS/YS ratio	Elongation , percent on gauge length
1	TMT	8	0.396	549	635	1.16	14
2	TMT	10	0.618	556	649	1.17	16.5
3	TMT	12	0.889	568	656	1.15	18

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 17.05.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (Raft)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	10.05.2021	17.05.2021	8.165	352.9	15.68
2	10.05.2021	17.05.2021	8.099	364.6	16.20
3	10.05.2021	17.05.2021	8.124	382.3	16.99

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 07.06.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (Raft)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	10.05.2021	07.06.2021	8.025	364.9	16.22
2	10.05.2021	07.06.2021	8.174	371.2	16.50
3	10.05.2021	07.06.2021	8.136	379.6	16.87

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 17.05.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (Raft)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	10.05.2021	17.05.2021	8.165	402.6	17.89
2	10.05.2021	17.05.2021	8.174	421.8	18.75
3	10.05.2021	17.05.2021	8.098	396.2	17.61

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 07.06.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (Raft)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	10.05.2021	07.06.2021	8.142	378.2	16.81
2	10.05.2021	07.06.2021	8.122	381.1	16.94
3	10.05.2021	07.06.2021	8.154	368.9	16.40

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 19.05.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	19.05.2021	8.021	349.6	15.54
2	13.05.2021	19.05.2021	8.145	357.1	15.87
3	13.05.2021	19.05.2021	8.178	382.6	17.00

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 09.06.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	09.06.2021	8.154	339.1	15.07
2	13.05.2021	09.06.2021	8.096	346.2	15.39
3	13.05.2021	09.06.2021	8.174	352.6	15.67

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 19.05.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	19.05.2021	8.024	512.6	22.78
2	13.05.2021	19.05.2021	8.154	524.9	23.33
3	13.05.2021	19.05.2021	8.196	539.1	23.96

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 09.06.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	09.06.2021	8.157	546.2	24.28
2	13.05.2021	09.06.2021	8.198	528.9	23.51
3	13.05.2021	09.06.2021	8.032	534.1	23.74

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Date: 19.05.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 7th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	19.05.2021	8.024	532.9	23.68
2	13.05.2021	19.05.2021	8.179	528.7	23.50
3	13.05.2021	19.05.2021	8.215	516.2	22.94

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 09.06.2021

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

Name of the work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

Sample ID : Cement Concrete (wall)

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

Grade of Concrete : M_{20}

Compressive Strength as on : 28th day

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.05.2021	09.06.2021	8.157	513.9	22.84
2	13.05.2021	09.06.2021	8.198	529.3	23.52
3	13.05.2021	09.06.2021	8.028	527.1	23.43

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b No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 24.06.2021

PRECAST SLAB 100mm Thick(CORE) TEST REPORT

lient : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

ontractor : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

ame of Work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

o.of Sample Tested : 03

ate of Testing : 24.06.2021

echinical Reference : IS:516-1959 (Reaffirmed 1999), SP-24:1983.

rade of Concrete : M_{20}

No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	80.00	0.369	2349.13	1.60	0.957	34.50	17.57	18.98	18.16	22.70
2	50.00	85.00	0.378	2264.87	1.70	0.968	33.90	17.27	18.65	18.04	22.55
3	50.00	80.00	0.364	2317.30	1.60	0.957	33.10	16.86	18.21	17.42	21.77

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Job No.: CQCE/BBMP/VP/W.No 10/2021-2022 Date : 14.06.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**: Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**: Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
BIS code:	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	14.06.2021

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 400.12
1	Flakiness Index %	10.8	10.5	Combined Flakiness & Elongation index Max 35%
2	Elongation Index %	11.9	11.3	
	Combined Flakiness & Elongation index	22.70	21.8	

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Job No.: CQCE/BBMP/VP/W.No 10/2021-2022 Date : : 14.06.2021

GRADATION FOR WMM

: **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

: **Sri.B.P. Shanmugam,** Contractor, Bangalore.

of Work Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

le: : IS 2386 (Part 1):1963(RA 2011)

f Testing : 14.06.2021

l Type : Wet Mix Macadam

Oven Dry.Wt, grams 10000

ve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Requirement as per MORTH 5th edition table no 400.13
53	0	0	0	100	100
45	204	204	2.0	98.6	95-100
22.4	2554	2758	27.6	74.2	60-80
11.2	2158	4916	49.2	51.2	40-60
4.75	1897	6813	68.1	32.6	25-40
2.36	1154	7967	79.7	21.3	15-30
0.600	582	8549	85.5	15.2	8-22
0.075	1215	9764	97.6	3.8	0-5

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ASSISTANT EXECUTIVE ENGINEER
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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 06.09.2021

Aggregate Gradation Test

Client	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	06.09.2021

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
26.50	715	7.2	7.15	92.85	90 - 100	
19.00	1265	12.7	19.80	80.20	71 - 95	
13.20	1385	13.9	33.65	66.35	56 - 80	
4.75	2514	25.1	58.79	41.21	38 - 54	
2.36	1097	11.0	69.76	30.24	28 - 42	
0.300	1319	13.2	82.95	17.05	7 - 21	
0.075	1156	11.6	94.51	5.49	2 - 8	

Total Weight of Sample: **10000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
26.5	685	6.9	6.85	93.15	90 - 100	
19	1415	14.2	21.00	79.00	71 - 95	
13.2	1136	11.4	32.36	67.64	56 - 80	
4.75	2415	24.2	56.51	43.49	38 - 54	
2.360	1159	11.6	68.10	31.90	28 - 42	
0.300	1312	13.1	81.22	18.78	7 - 21	
0.075	1174	11.7	92.96	7.04	2 - 8	

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JobNo: CQCE/BBMP/VP/W.No.10/2021-22 Date: : 06.09.2021

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalo
Agency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of work :Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
Source / Location : Hot Mix Plant, Bangalore
BIS Code : IS 2386 Part (4):1963
Type of Mix : Dense Graded Bituminous Macadam
Date of test : 06.09.2021

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	404	406	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	88	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	316	320	
5	Aggregate Impact value = percent fines 100* (W2/W1) percent	21.78	21.18	**21.48**

Comments:
→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

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Authorised Signatory

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JobNo: CQCE/BBMP/VP/W.No.10/2021-22 Date : 08.09.2021

TEST RESULTS OF AGGREGATE SHAPE TEST (Flakiness & Elongation)

ient : **Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

gency : **Sri.B.P. Shanmugam,** Contractor, Bangalore.

ame of work : Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division

S Code : IS 2386 Part (1):1963

ate of Test : 08.09.2021

pe of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	11.30	11.80	23.10	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	12.50	11.10	23.60	

te:

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b No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 08.09.2021

Specific Gravity And Water Absorption Test

ient	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
gency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
ame of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
IS Code	IS 2386(Part 3):1963
ype of Mix	Dense Graded Bituminous Macadam
ate of Testing	06.09.2021 to 08.09.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2022	2023	
2	Weight of basket suspended in water	W_2 g	756	756	756	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1264	1266	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2017	2016	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	750	748	
6	Weight of oven dried aggregate	W_4 g	2007	2007	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.665	2.676	2.680	2.674
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.701	2.709	2.717	2.709
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.45%	0.50%	0.48%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

For CIVIL AIM CONSULTANTS & ENGINEERS

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Job No: CQCE/BBMP/VP/W.No.10/2021-22

Date: 08.09.2021

TEST REPORT ON PAVING BITUMEN

Client	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
BIS Code	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	**08.09.2021**
Type of Mix	**Dense Graded Bituminous Macadam , VG 30**
Source of Location	**Hot Mix Plant**

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	64	Min 45
2	Softening point, 0C	47	Min 47
3	Ductility at 250C, cm	99	Min40
4	Flash Point, 0C	228	Min 220

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Authorised Signatory

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 13.09.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the Work	:	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	13.09.2021

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.76	9.64	9 Kn (min)
2	Marshal flow, mm	3.58	3.28	2 – 4
3	Percent air voids in Mineral Aggregate	14.74	13.42	13 – 15
4	Voids in Compacted Mix	3.89	3.92	3 – 6
5	Percent Voids filled with Bitumen	68.91	69.52	65 - 75
6	Density, g/cc	2.25	2.27	--

Note:

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22 Date: 13.09.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

lient	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
gency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
ame of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
ate of Testing	13.09.2021

ITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
Weight of Mixture before Test, g	500	500
Weight of Mixture after Test, g	477.1	477.6
Weight of Asphalt and Mineral matter Extracted, g	-	-
Weight of Mineral Matter, g.	-	-
Weight of Ash, g		
Weight of Bitumen Extracted, g. (corrected)	22.90	22.40
Bitumen content in %	4.58	4.48
Average	**4.53**	

RADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	34.4	34.4	7.2	92.8	90 - 100
19	73.9	108.3	22.7	77.3	71 - 95
13.2	66	174.3	36.5	63.5	56 - 80
4.75	84	258.3	54.1	45.9	38 - 54
2.360	76	334.3	70.1	29.9	28 - 42
0.300	96.8	431.1	90.4	9.6	7 - 21
0.075	21.6	452.7	94.9	5.1	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36.5	36.5	7.6	92.4	90 - 100
19	73.4	109.9	23.0	77.0	71 - 95
13.2	66.8	176.7	37.0	63.0	56 - 80
4.75	84.50	261.2	54.7	45.3	38 - 54
2.360	78.6	339.8	71.1	28.9	28 - 42
0.300	98.5	438.3	91.8	8.2	7 - 21
0.075	23.4	461.7	96.7	3.3	2 - 8

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Date : 02.10.2021

Lab No.: CQCE/BBMP/VP/W.No.10/2021-22

Aggregate Gradation Test
IS : 2386 Part I

	Assistant Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
nt	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
ncy	
e of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
Code	IS 2386(Part 1):1963
ple I / D	Hot Mix Plant, Bangalore
e of Mix	Bituminous Concrete
of Testing	02.10.2021

Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	415	8.30	8.30	91.70	90 - 100	
9.5	485	9.70	18.00	82.00	70 - 88	
4.75	635	12.70	30.70	69.30	53 - 71	
2.36	678	13.56	44.26	55.74	42 - 58	
1.18	524	10.48	54.74	45.26	34 - 48	
600	556	11.12	65.86	34.14	26 - 38	
300	485	9.70	75.56	24.44	18 - 28	
150	325	6.50	82.06	17.94	12 - 20	
075	485	9.70	91.76	8.24	4 - 10	

Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	685	13.70	13.70	86.30	90 - 100	
9.5	545	10.90	24.60	75.40	70 - 88	
4.75	684	13.68	38.28	61.72	53 - 71	
2.36	539	10.78	49.06	50.94	42 - 58	
1.18	584	11.68	60.74	39.26	34 - 48	
600	545	10.90	71.64	28.36	26 - 38	
300	684	13.68	85.32	14.68	18 - 28	
150	157	3.14	88.46	11.54	12 - 20	
075	336	6.72	95.18	4.82	4 - 10	

Remarks:

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No.: CQCE/BBMP/VP/W.No.10/2021-22

Date : 02.10.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

nt	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
ency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
me of Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
hnical Reference	IS 2386(Part 1) 1963 (RA 2011)
e of Mix	Bituminous Concrete
e of Testing	02.10.2021

o	Test	1	2	3	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	11.5	9.8	10.2	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	10.6	9.9	10.6	
	Combined Flakiness & Elongation index	22.10	19.70	20.80	

e:

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date : 04.10.2021

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
IS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	02.10.2021 to 04.10.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2020	2024	
2	Weight of basket suspended in water	W_2 g	756	756	756	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1264	1268	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2015	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	750	751	751	
6	Weight of oven dried aggregate	W_4 g	2005	2006	2009	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.673	2.671	2.675	2.673
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.709	2.704	2.711	2.708
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.45%	0.50%	0.48%

Comments:

1. Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500).

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 04.10.2021

TEST REPORT

Client	:	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the work	:	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	04.10.2021

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	54	Min 45
2	Softening point, ^{0}C	51	Min. 47
3	Ductility at 27^{0}C, cm	> 100	Min. 40
4	Flash Point, ^{0}C	288	Min. 220

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Aggregate Impact Value

Date: 4.10.2021

Client	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	4.10.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.34	22.37	**22.35**

Comments:

Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table 500.16)

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Job No.: CQCE/BBMP/VP/W.No.10/2021-22

Date: 11.10.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore..
Agency	:	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
Name of the Work	:	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	11.10.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.21	10.24	9 Kn (min)
2	Marshal flow, mm	3.8	2.98	2 – 4
3	Percent air voids in Mineral Aggregate	12.84	14.65	13 – 15
4	Voids in Compacted Mix	3.62	4.65	3 – 6
5	Percent Voids filled with Bitumen	67.16	69.22	65 - 75
6	Density, g/cc	2.25	2.26	--

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No: CQCE/BBMP/VP/W.No.10/2021-22 Date : 11.10.2021

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

NT	**Assistant Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
NCY	**Sri.B.P. Shanmugam,** Contractor, Bangalore.
E OF THE WORK	Improvements to Roads and Drains at KNV 2nd Stage Muneshwara Layout in Ward No 10 Doddabommasandra Vidyaranyapura Sub Division
PLE ID	Hot Mix Plant, Bangalore
E OF TESTING	11.10.2021

MEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
eight of Mixture before Test, g	500	500
eight of Mixture after Test, g	473	472.5
eight of Asphalt and Mineral matter Extracted, g	27	27.5
eight of Mineral Matter, g.	-	-
eight of Ash, g	-	-
eight of Bitumen Extracted, g. (corrected)	27	27.5
itumen content in %	5.40	5.50
verage	5.45	

DATION AFTER EXTRACTION

EVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.4	12.4	2.6	97.4	90 - 100
9.5	65.4	77.8	16.4	83.6	70 - 88
4.75	98	175.8	37.2	62.8	53 - 71
2.36	46.5	222.3	47.0	53.0	42 - 58
1.18	43.2	265.5	56.1	43.9	34 - 48
0.600	52.1	317.6	67.1	32.9	26 - 38
0.300	44.9	362.5	76.6	23.4	18 - 28
0.150	33.1	395.6	83.6	16.4	12 - 20
0.075	49.2	444.8	94.0	6.0	4 - 10

EVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	12.4	12.4	2.6	97.4	90 - 100
9.5	65.4	77.8	16.5	83.5	70 - 88
4.75	98	175.8	37.2	62.8	53 - 71
2.36	46.5	222.3	47.0	53.0	42 - 58
1.18	43.2	265.5	56.2	43.8	34 - 48
0.600	52.1	317.6	67.2	32.8	26 - 38
0.300	44.9	362.5	76.7	23.3	18 - 28
0.150	33.1	395.6	83.7	16.3	12 - 20
0.075	49.2	444.8	94.1	5.9	4 - 10

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